CHAPTER 1. GENERAL

1. WHO MAY SPONSOR AN AVIATION EVENT? Anyone, either an individual or an organization, who wishes to sponsor an aviation event may do so as long as the proper forms and supporting documentation are submitted to the FAA and subsequently approved.

2. SPONSOR EXPERIENCE. The experienced sponsor of an aviation event is generally well acquainted with the requirements and procedures for obtaining the necessary waiver. However, in some instances, individuals or organizations attempting to sponsor an event for the first time are not aware that an FAA Form 7711-1, Certificate of Waiver or Authorization, is required. For an inexperienced sponsor, the local FAA Flight Standards District Office (FSDO) can provide valuable information and assistance.

3. INDUSTRY ASSISTANCE. Additional guidance from industry representatives may be obtained by contacting the International Council of Air Shows (ICAS), P.O. Box 1105, 1910 Horton Road, Jackson, Michigan 49204, (517) 782-2424. This organization, comprised of aviation event sponsors and performers from all over the world, can provide valuable assistance. Also, numerous independent clubs and associations formed by airshow performers, such as the Professional Airshow Performers Association (PAPA), can provide the same type of information. In addition, there are several commercial aviation event groups that offer a wide variety of services ranging from assisting and staging, to contracting an entire aviation event. Many of these clubs, associations, and commercial groups are affiliated with the Experimental Aircraft Association (EAA), Wittman Airfield, Oshkosh, Wisconsin 54903. Further information may be obtained by contacting the EAA at (414) 426-4800.

4. SPONSOR PLANNING. Thorough planning has a direct bearing on the success and safety of any event. Therefore, it is in everyone's best interest that an effective plan for all facets of the event be developed.

a. ***Preshow Planning.*** The following items should be discussed with the FAA FSDO before beginning preparation of FAA Form 7711-2, Application for Certificate of Waiver or Authorization.

(1) *Type of Event* (aerobatics, balloon race, parachute demonstration, etc.).

(2) *Status of Performers* (military versus civilian).

(3) *Site Selection.*

(i) Airport sites.

(ii) Fairgrounds.

(iii) Other sites.

(iv) Planned crowd control.

(4) *Policing of the safety zone.*

(5) *Communications.*

(6) *Emergency equipment and personnel.*

(i) Physician.

(ii) Ambulance.

(iii) Firetruck.

(iv) Crash wagon.

(v) Other.

(7) *Normal airport traffic.*

(8) *Vehicular traffic problems.*

b. ***Post-event Planning.*** Most successful sponsors dedicate considerable time and effort planning for the conclusion of the aviation event. They do this because they understand that all the effort expended producing a successful show could be ruined in the chaos that follows the termination of the event. With the disappearance of crowd control personnel, sponsors have learned that the more spectators kept at the show site for a period of 30 to 40 minutes after the main attraction, the safer it will be for everyone. Some examples of ways to keep spectators at the show site are:

(1) *Have the demonstration pilots remain* after the show to talk with the spectators and sign autographs.

(2) *Conduct* a raffle or drawing and give away the prizes after the show ends.

(3) *The demonstration aircraft* can be put on display at the end of the show so that the remaining spectators can get a closer look at both aircraft and performer.

5.-10. RESERVED.

CHAPTER 2. PREPARATION FOR AN AVIATION EVENT

SECTION 1. PREAPPLICATION PREPARATION

11. DETERMINING WHICH SECTIONS OF THE FAR NEED TO BE WAIVED. The sections of the FAR that will need to be waived depend largely on the types of operations to be conducted at the aviation event. In an effort to determine which sections of the FAR need to be waived, the sponsor should ask himself or herself certain questions.

a. ***Questions that should be asked are:***

(1) What sort of routines will be staged?

(2) Will there be demonstrations by small, slow-speed aircraft only or will high performance aircraft be involved?

(3) Will military demonstration teams participate?

(4) Will a parachute demonstration be staged?

(5) Will the event include hot air balloon ascensions?

b. ***The answers to these questions*** and other areas unique to each aviation event will help the sponsor in determining which FAR need to be waived.

12. SITE SELECTION.

a. ***Selection of a site for an aviation event*** is of the utmost importance. If the selected site does not permit the minimum separation distances discussed in paragraph 15, FAA Form 7711-2, Application for Certificate of Waiver or Authorization, shall not be approved. It is important that the selection accommodate all the specific types of aerial demonstrations, without derogating safety or creating a hazard to any nonparticipant or spectator. In addition, it is imperative that all areas adjacent to the show site containing homes, factories, major highways, well-traveled thoroughfares, or any occupied vessel, vehicle, or structure, be carefully evaluated before making a final decision for site selection.

(1) *Airports.* An airport environment is probably best suited for aerial demonstrations/aviation events. If the local airport environment provides the necessary separation distances, it should be given first consideration as a probable site since demonstration pilots prefer a runway within gliding distance of the demonstration area.

(i) The spectator area should be clearly defined. Frontage of the spectator area might range from 1,500 feet to 3,000 feet. It is not recommended that the spectator area frontage be greater than 3,000 feet. This is to allow proper run-in and exit corridors for participating aircraft.

(ii) Depth of the spectator area is deter-mined by required display areas, paved surfaces, and other considerations which are peculiar to each facility. The important point is to define the frontage and sides of the spectator area, making them compatible with planned aerial demonstrations.

(2) *Fairground Sites.* In some instances, fairgrounds are selected as sites in lieu of attempting to stage an event at a less than ideal airport site. These sites offer certain advantages not normally found at an airport. The grounds are generally well fenced, usually making crowd control a simple task. Also, frequently, grandstands or bleachers, concession stand areas, well-marked first-aid stations, police, and some-

times a fairground fire department are readily established. In addition, the typical fairground is better able to cope with the vehicular traffic generated by an event than the typical airport that may have only one or two access roads.

(3) *Other Sites.* A lake or other open area bordering the edge of a town or at a park where an open area could be found may provide a desirable site for certain aerial demonstrations. In any case, the area over which the aerobatic demonstrations are to be conducted must be void of vehicles, persons, or inhabited structures.

b. ***Airport Coordination.*** Most of the support functions necessary to accommodate and service aircraft are located at airports. In addition, the (normally) vast expanse of open area found at airports is conducive to better spectator visibility and comfort. Pilots also prefer operating from an airport environment because it provides direct access to runways and open areas for any emergency requiring an immediate landing. Every aviation event will require the closing of the selected facility for some period of time. This may range from a short time on the weekend to long periods on the days before the event and during the actual show days. Do not forget that certain portions of the facility may need to be closed to accommodate physical setup and preparation for the event. The impact of all this must be considered as a part of the early site evaluation.

c. ***Air Traffic Control.*** Naturally, if the airport is served by a control tower, radio communications will be handled by the Air Traffic facility. Care must be taken to ensure that radio communications or prearranged ground-to-air signals are established with each performer as a preface to the conduct of the actual event. Even if every aircraft is equipped with two-way radio, a ground-to-air recall signal must also be provided to the performers. If the airport is served by a scheduled air carrier, arrangements must be made for the arrival and departure of such aircraft. Generally, it is adequate to schedule a break in the activities to allow for scheduled arrivals and departures.

d. ***If there is not 1,000 feet*** between the primary and the secondary spectator areas, the location will not be considered for an aviation event waiver.

e. ***If the site cannot provide a 500-foot distance*** from the showline to the spectators, the location will not be considered for an aviation event waiver.

13. SUPPORTING DATA. For most events, supporting data must address the following major concerns:

a. ***Where the public attends the event,*** it is necessary that adequate "spectator areas" be provided to isolate spectators from:

(1) Flight areas.

(2) Active runways.

(3) Runup areas.

(4) Other active areas such as emergency or police helipads, parachute landing areas, etc.

b. ***Methods that will be used*** to ensure areas outside of the designated spectator area will also be secure.

c. ***Maps, charts, diagrams, or other data*** appropriate to the activities and locations should be submitted with the application. For an aviation event, an appropriate 7.5 series Topographic Quadrangle Map, published by the U.S. Geological Survey (Scale 1:24,000), for the proposed area should be submitted. Additional aerial photographs depicting the entire site and ranging out from the show center to a radius of from 1/2 to 2 1/2 miles, depending upon the type of event planned, may also be submitted. Appropriate showlines, safety zones, spectator areas, control

centers, location of emergency facilities, etc., should accompany FAA Form 7711-2.

14. SELECTION OF PERFORMERS. Before the FAA approves any pilot to perform low-level aerobatics in close proximity to spectators or other persons on the surface, that pilot's competency to safely perform individual routines must be verified. Except for pilots assigned to official military teams, each pilot must be properly certificated and rated for the aircraft to be flown. In addition, each pilot must possess a current FAA Form 8710-7, Statement of Aerobatic Competency, signed by an FAA inspector (Appendix 1, Figure 4).

a. ***If a demonstration pilot does not hold*** an FAA Form 8710-7, the FAA will require a satisfactory demonstration of the aerobatic routine. When this has been accomplished, an FAA Form 8710-7 will be issued and the airman will be allowed to participate under the terms and conditions of the waiver. Early application for FAA Form 8710-7 is encouraged because of the critical time constraints just before an aviation event. The responsibility for obtaining the Statement of Acrobatic Competency lies with the airman, not the aviation event sponsor.

b. ***Nonairmen participants,*** such as parachutists, can be accepted on the basis of a license issued by the United States Parachute Association (USPA) or similar license. Further guidance on parachutists and parachuting can be found in Chapter 6.

c. ***The FAA does not require certification or licensing*** of operators of ultralight vehicles, wing-walkers, ribbon cut personnel, and drivers of vehicles for a car-to-plane transfer.

d. ***In order to avoid a possible cancellation*** of a performer or a delay of the aviation event, verification that all scheduled participants are properly qualified and/or certificated by the FAA and, where appropriate, by other FAA recognized groups or organizations should be made.

e. ***Further guidance on military teams*** can be found in Chapter 3.

f. ***If an air race is part of the aviation event,*** guidance for an air race course design can be found in Chapter 4.

g. ***Further guidance on balloon meets and balloon competitions*** can be found in Chapter 5.

15. ESTABLISHING THE SHOWLINES.

a. ***The establishment of the showlines*** as the first order of business is preferable to establishing the crowd line and then determining the showlines.

b. ***In order to enhance safety,*** the showline may be moved toward or away from the spectator area to give the performer a more identifiable reference. However, the showline should not be moved from specified distances.

c. ***The 500-foot showline*** represents the minimum horizontal distance that is authorized under FAR § 91.79(c). The 500-foot showline is **NEVER** waived with regard to any spectator area. Routines that involve several aircraft in formation or nonaerobatic fly-bys must ensure that the nearest aircraft to the spectator area does not operate closer than 500 feet. This may require that the showline be more than 500 feet from the spectator area.

d. ***The showline is used as a reference*** by the performer or, in the case of formation flight, by the formation's leader. It is of paramount importance that showlines provide guidance to the performers during their routines. In the case of aircraft formations, performers must adjust to the showline to ensure that the critical aircraft is not closer than 500 feet from a spectator area. If the takeoff runway is closer than 500 feet from the primary or secondary spectator areas, no aerobatics may be permitted until the aircraft has passed the end of the spectator area and then only if there is no congested area or spectators under the

performing aircraft. Under the same conditions, an aerobatic maneuver may be performed after takeoff following a turn away from spectator areas.

e. ***Pilots performing flight demonstrations*** must maintain the following minimum showline distances from the spectator areas. These distances are predicated on 75 percent power in straight and level flight for piston aircraft. For turbine aircraft, the distances are based on demonstrated normal cruise speed. Showline categories, speeds, and distances are shown in Table 1.

f. ***As described in the table below,*** three different showlines might be required when all three categories of aircraft are participating at a show site. Because all show sites do not have prominent surface lines for use as showlines that are located exactly 500, 1,000, or 1,500 feet from spectator areas, it may not be possible to move the spectator area to arrive at these distances. The optimum situation is when prominent showlines are 500, 1,000, or 1,500 feet from spectator areas as appropriate to the aircraft being operated at the show. These distances from the showline to the spectators for each category of aircraft are desirable, however, there are other considerations. There shall be no waiver of the 500-foot showline for Category III aircraft. For a show site where a runway is located less than that prescribed from an area that provides for the safety of the spectators, it is desirable to use the runway as the showline rather than a poorly marked line at the 1,000- or 1,500-foot mark. The safety of the performance and that of the spectators is enhanced by the participants using a well-defined showline. This is not to say that the spectator areas should be enlarged so that the optimum prescribed distances are not available. Again, for the safety of the performers and the spectators, the showline may be moved in or out to avoid antennas, windsocks, tree lines, etc. The showline, however, may not be closer than the minimums specified in the following paragraphs.

(1) *Category I Showline.* The optimum showline distance from spectator areas for Category I aircraft shall be 1,500 feet or greater (Appendix 1, Figure 5). If the only well-defined showline is closer than 1,500 feet to a spectator area and it is not possible to move the spectator

Table 1. Showline Categories, Speeds, and Distances

CATEGORY	CRUISE SPEED	SHOWLINE DISTANCE FROM SPECTATOR AREA
I	More than 245 knots (282 MPH)	1,500 feet
II	More than 156 knots Less than 245 knots (181 to 282 MPH)	1,000 feet
	Aerobatic Helicopters	1,000 feet
III	Less than 156 knots (180 MPH)	500 feet
	Aerobatic Gliders (Sailplanes)	500 feet
	Nonaerobatic Aircraft	500 feet

area so that it is 1,500 feet from the showline, the showline may be approved down to **AN ABSOLUTE MINIMUM DISTANCE OF 1,200 FEET.** When there is a reduction in the distance from the showline to the primary spectator area, a similar reduction **SHALL NOT BE PERMITTED** on the secondary spectator area side of the showline (Appendix 1, Figures 6 and 7). For example, if the showline is 1,300 feet from the primary spectator area, there must remain 1,500 feet from the showline to the secondary spectator area. **IN NO CASE SHALL THERE BE LESS THAN 2,700 FEET BETWEEN THE PRIMARY AND THE SECONDARY SPECTATOR AREAS.**

(2) *Category II Showline.* The optimum showline distance from spectator areas for Category II aircraft shall be 1,000 feet. If the only well-defined showline is closer to a spectator area than 1,000 feet, and it is not possible to move the spectator area so that it is 1,000 feet from the showline, it may be approved down to **AN ABSOLUTE MINIMUM DISTANCE OF 800 FEET** (Appendix 1, Figure 8). When there is a reduction in the distance from the showline to the primary spectator area, a similar reduction **SHALL NOT BE PERMITTED** on the secondary spectator side. For example: If the showline is 800 feet from the primary spectator area, there must remain 1,000 feet from the showline to the secondary spectator area. **IN NO CASE SHALL THERE BE LESS THAN 1,000 FEET BETWEEN THE PRIMARY AND THE SECONDARY SPECTATOR AREAS.**

(3) *Category III Showline.* The showline **SHALL NOT** be closer than 500 feet from the primary or secondary spectator areas (Appendix 1, Figure 9).

g. ***The 500-foot showline*** may also be used for Category I or II aircraft being flown nonaerobatically and parallel to the primary and/or secondary spectator area.

h. ***An arc directed away from the crowd,*** i.e., "Pass in Review" maneuver, may be flown provided the aircraft remain at least 500 feet from the primary and/or the secondary spectator area.

i. ***Takeoff and Landing Areas.***

(1) *When the takeoff runway is closer than 500 feet* from the primary or secondary spectator areas, no aerobatics are permitted until the aircraft passes the end of the spectator area and then only if there is no congested area or spectators under the aircraft that is performing aerobatics (Appendix 1, Figure 10).

(2) *When the takeoff runway is less than 500 feet* from the spectators, an aerobatic maneuver may be performed after takeoff following a turn away from spectator areas (Appendix 1, Figure 11).

(3) *Spectator areas may not be located closer than 500 feet* from any takeoff and landing runway or area when the normal landing speed of any aircraft exceeds 100 knots (Appendix 1, Figure 12).

(4) *The "flying farmer" or similar routines* that involve excessive maneuvering immediately after take-off or just before landing must also be separated from the spectator area by at least 500 feet (Appendix 1, Figure 12).

(5) *If the entire airshow involves aircraft* with landing speeds less than 100 knots and there is not excessive maneuvering during takeoff or landing, spectators may be located as close as 200 feet from the takeoff or landing areas (Appendix 1, Figure 13).

j. ***Engine Run Areas.*** Areas where engines, propellers, or rotors will be turning must be at least 100 feet from the spectator area unless they are protected by a barrier that prevents entry by unauthorized personnel.

k. ***Rotorcraft Takeoff and Landing Areas.*** During some aviation events there may be helicopters taking "VIP's" for rides or serving as emergency vehicles. The landing and takeoff areas used by these aircraft should be enclosed in a manner that prevents unauthorauthorized persons from entering the helipad. The helipads should be located so the aircraft does not pass over spectators during takeoff or landing. Regardless of the emergency or nature of the operation, spectators must not be endangered.

l. ***Sailplane Operations.*** Airshow aerobatic demonstrations with sailplanes are becoming more numerous around the country. Sailplanes, by their very nature, are less hazardous than powered aircraft. Sailplanes do not have engines and propellers, nor do they carry flammable liquids that could cause injury to spectators. For these reasons, the following criteria apply **ONLY TO SAILPLANE OPERATIONS.**

(1) *Sailplanes fall into the Category III group.* Category III showline and performance distances apply.

(2) *Because of the sailplane's need for a tow* by either an airplane or a car, taxiways are often used for takeoff. This is advantageous in many cases since it allows the tow plane, towline, and the sailplane to be positioned without congesting the active runway or affecting the operation of powered aircraft. Unless there are obstructions that would make a taxiway takeoff unsafe, it should be permitted with a minimum distance from the primary spectator area of 200 feet (Appendix 1, Figure 14). This distance may be reduced to 150 feet when the takeoff path, beginning at or near the center of the spectator area, is at an angle of at least 10^{0} away from spectators (Appendix 1, Figure 15).

(3) *Landings may be approved on the taxiway* used for the takeoff as long as there are no obstructions or adverse wind conditions that would create a hazard to the spectators. If the landing approach requires a low altitude turn over spectators, landing on the taxiway shall not be permitted.

(4) *This part does not apply* to motorgliders which are treated as powered aircraft.

16. POLICING. There is no specific requirement for the use of uniformed police or security guards. The need for special policing depends upon several factors.

a. ***If fencing is used for crowd control,*** there may be little need for special crowd-control personnel. On the other hand, if the sponsor intends merely to cordon off the primary or secondary spectator areas with rope, it might be necessary to have special crowd-control personnel.

b. ***With respect to crowd control,*** remember that it is the sponsor's--**NOT** the FAA's responsibility--to ensure that all reasonable efforts are made to confine spectators to the primary and secondary spectator areas. If reasonable efforts have been taken and unauthorized persons or vehicles enter the area where aviation event aerobatic maneuvers are performed, efforts must be made to remove them from the area. Good judgment should be used when determining whether it is necessary to halt a show to protect persons on the ground.

c. ***One policing need that is often ignored*** is the airspace where aviation event aerobatic maneuvers are performed overlaps roads or highways. This can present a problem unless arrangements are made to control traffic. If a road runs beneath the operating area and that road is not patrolled, motorists could park on the shoulders to enjoy the show. If this condition exists, arrangements should be made to have the traffic controlled. Transition over a road or highway underlying the operating area is the same as egress or ingress over congested areas. There is no requirement for termination of an aviation event aerobatic maneuver at a given distance from a road or highway, but, as with a congested area, aviation event aerobatic maneuvers may not

be performed over roads or highways unless the road or highway has been closed and no persons are allowed to park along the road or highway.

d. ***If there are farmhouses or other buildings*** below the airspace where aviation event aerobatic maneuvers are performed, a reasonable effort to evacuate such buildings during the aviation event should be made. If persons re-enter the buildings, every effort should be made to evacuate them again.

17. EMERGENCY FACILITIES. Generally, the FAA shall not require much more in terms of emergency facilities than are normally found at airports. Off-airport sites can be another matter, and, before selecting such a site, serious consideration should be given to emergency facilities at such sites. Every aviation event sponsor is encouraged to provide emergency medical service even though this service is not normally necessary. Many sponsors prefer to have the local fire department's emergency rescue squad, paramedics, or emergency medical technicians at their show rather than a physician. Normally, the following rules of thumb are adequate:

a. ***Physician.*** Except for events that are a great distance (in a ground vehicle) from a hospital or medical clinic, an emergency rescue squad, paramedics, emergency medical technicians, or a first-aid station can be substituted for a physician.

b. ***Ambulance.*** If an emergency rescue squad is provided, an ambulance should also be provided. If there is a physician in attendance, any vehicle acceptable to the physician for emergency transportation is sufficient. Many communities rely on a sheriff's or local law enforcement officer's vehicle as their only means of ambulance service. It would be improper to prohibit use of a similar vehicle to serve as an ambulance for the event.

c. ***Firetruck.*** For the most part, the only reason for having a firetruck at an aviation event is for performers' benefit, not the spectators'. If the performers are willing to accept a pickup truck with handheld fire extinguishers, the FAA does not demand a sponsor provide an official firetruck with trained firemen.

d. ***Crash Wagon.*** Many locations where events are conducted do not have crash wagons available. If they are not available, the FAA does not require a sponsor to obtain one from a facility that might be hundreds of miles away. Again, the presence of crash wagons benefits the performers, not the public.

e. ***Aerobatic school activities or aerobatic meets,*** which are not aviation events, contests, or races, require a waiver. At these school activities or meets not advertised as aviation events, it may not be necessary for the school or sponsor to provide policing or emergency facilities.

f. ***Some professional performers do not accept a contract*** or an invitation unless liability insurance has been obtained and/or adequate first aid and emergency medical transportation are provided. Also, performers might demand that, for their own protection, a firetruck with trained personnel be provided.

18. FAA FORM 7711-2. FAA Form 7711-2, Application for Certificate of Waiver or Authorization (Appendix 1, Figure 16), is used when applying for FAA Form 7711-1, Certificate of Waiver or Authorization (Appendix 1, Figure 17).

a. ***The local FAA FSDO assists*** in the preparation of FAA Form 7711-2; however, the preparation and submission of FAA Form 7711-2, as well as all of the necessary supporting documentation, are the responsibility of the applicant.

b. ***Depending on the type of aviation event*** or operation, all items on the form may not be applicable. In other cases, additional information may be required.

c. ***An application for an aviation event*** must be submitted at least 45 days before the date of the scheduled event.

d. ***An application for a parachute jump*** must be submitted at least 4 days before the scheduled event.

e. ***Upon receipt,*** the FAA FSDO reviews the application for accuracy. Because the information submitted on FAA Form 7711-2 **CANNOT** be altered by the FAA FSDO, the FAA inspector-in-charge will arrange a meeting in order to correct the application.

f. ***Upon approval by the FAA FSDO,*** FAA Form 7711-2 becomes a part of FAA Form 7711-1 (Appendix 1, Figure 17).

19. SCHEDULE OF EVENTS. The FAA must see a schedule of events in order to evaluate the application. The schedule of events does not need to be detailed. However, it should contain at least a general description of the types of events (e.g., aircraft aerobatic performances, skydivers, car/plane transfer, etc.), the identification of the aircraft, and the performers in the sequence of their appearance.

a. ***A date must be specified*** when a schedule of events will be provided.

b. ***Any demonstrations added*** to the "Schedule of Events" require FAA approval. Any additions should be submitted to the FAA for consideration at the earliest opportunity. Cancellation of events does not require advance notice to the FAA. However, press shows or other flight activity occuring outside the approved dates and times are not considered additions. A revised or new waiver application will be required.

20.-24. RESERVED.

SECTION 2. MANAGING THE AVIATION EVENT

25. PRESHOW ACTIVITY.

a. ***Schedules and priorities*** have a tendency to get hectic before the start of even a properly planned event, e.g., performers asking when and where the briefing is to take place, fire department personnel trying to find out where their trucks and ambulances are to be stationed, concession stand operators looking for electrical outlets, etc. If sufficient, responsible personnel have not been assigned to handle each aspect of the numerous functions associated with a successful event, last-minute problems can appear.

b. ***Preshow Briefing.*** One thing that is required of all waivers for aerial demonstrations is the preshow briefing of all performers. For performing teams, it is permissible for just the team leader or other performing member to attend in lieu of every member. The team leader or other performing member must then assume the responsibility for briefing each of the other members of the team. It is imperative that the briefing cover every aspect of the event. The following list of subjects shall be covered at every briefing:

(1) Weather brief.

(i) Who gives the briefing, i.e., sponsor, Flight Service Station specialist, etc.

(ii) Source of information.

(iii) If forecasts are involved, the valid time of forecasts.

(2) Runway in use.

(3) Taxi instructions.

(4) Performer aircraft parking.

(5) Aviation event radio communication frequencies.

(6) Emergency procedures.

(7) Showlines.

(8) Area avoidance.

(9) Review of provisions on the FAA waiver.

(10) Review of the schedule.

(11) Aircraft departure plan.

(12) Next briefing (if necessary).

(13) Questions.

(14) Credential check and signing area.

(15) ALL participants sign waiver.

(16) Fueling procedures.

c. ***Departure from Other Airports.*** At an airport location where a performing or fly-by aircraft will depart from a location other than the airshow site, a telephone briefing must be conducted with the pilots of those aircraft.

d. ***Nonairport Location Briefing.*** If the event is to be conducted at a nonairport location, special procedures for the briefing of the performers must be established. The performers must be informed well in advance of the briefing date, time, location, and if appropriate, directions to where the briefing will take place. In addition to the subjects listed in paragraph 25b, the briefing should cover any subjects unique to the aviation event location (e.g., desert terrain, mountainous area, site near water, etc.).

26. AVIATION EVENT PERSONNEL.

a. ***The actual number of individuals*** assigned to air and ground operations duties will vary dependent upon the size of the event. It may range from 3 or 4 people at a small aviation event to 50 or more at a large aviation event. It is important that all tasks be addressed and that no individual is so burdened that safety is compromised.

b. ***The aviation event director or a designated representative*** is responsible for all aspects of presenting the aviation event. It is his or her duty to set policy and monitor the conduct of the aviation event.

c. ***An independent safety observer*** should be assigned by and report directly to the aviation event director. An independent safety observer should use a checklist to monitor all air and ground operations activities throughout the aviation event. During the aviation event, the independent safety observer should immediately report any unsafe situation to the aviation event director.

d. ***It may be appropriate to have an assistant operations director*** to divide tasks. However, it is important that the final authority for air and ground operations authority be with one individual and not several who are working on numerous, independent tasks.

e. ***A primary responsibility*** of the air and ground operations director is to complete early and ongoing communication with the airport manager, FAA FSDO, and Air Traffic Control representatives. These individuals and representatives must be aware of aviation event activities and be kept informed.

f. ***Air and ground operations coordinators*** are responsible for accomplishment of all aspects of the specific area to which they are assigned. The following is a list of coordinators recommended by the International Council of Air Shows (ICAS):

(1) Act coordinator.

(2) Display aircraft coordinator.

(3) Maintenance support coordinator.

(4) Housing/Transportation coordinator.

(5) Special event coordinator.

(6) Military teams coordinator.

(7) Fly-in coordinator.

(8) Aircraft security coordinator.

(9) Operations assistants.

g. ***Operations assistants*** are individuals assigned to the various coordinators as necessary. For example, four assistants might be assigned to help park aircraft, or they may be a person specifically assigned to operate a radio in the tower.

h. ***All tasks of the air and ground operations staff*** might be accomplished by 1 or 2 people until approximately 30 days before the event. However, as the aviation event date approaches, the coordination and implementation of tasks is beyond the capability of one or two people. The appropriate number of staff coordinators should be identified and assigned early. This helps to prevent crisis management in the final days before and during the event weekend.

i. ***Written records should be required of all coordinators.*** These might consist of memos, records of phone calls, completed forms, records of meetings, checklists, and critiques. The idea is to have a clear and verifiable means to determine that all tasks have been completed and to create accurate records which may be used in future planning.

j. ***An air and ground operations checklist*** is a good tool to guide the staff through its various essential tasks. It should be adjusted to fit the specific event and built upon from year to year.

k. ***Administration is the management of all avialable resources.*** The management of all available resources is best conducted through effective communication and recordkeeping, both internally and externally to other departments. Each person on the air and ground operations team is responsible in some way for the administrative process.

27. FLYING PARTICIPANTS.

a. ***Each participant*** should have operational information pertinent to the scheduled aviation event before arriving at the site. It is recommended that a copy of the completed FAA Form 7711-2, including diagrams, maps, charts, photos, etc., be forwarded to participants at the same time the application is submitted to the FAA. It is recommended that participants be made aware of aircraft servicing procedures, where and when the aviation event briefing will take place, the time and location of any airworthiness inspections, and any additional information which will help participants be informed before their arrival. The idea is to impart as much operational information as practical in advance so that participants are not deluged at the last minute with operational procedures and instructions on top of an already packed schedule of activities.

b. ***Aircraft rides for hire and media flights*** are two unique flight operations which frequently must be addressed by aviation event organizers. Permission to conduct aircraft rides for hire is based upon the same criteria that is applied to any other participant. Thorough planning and thought should also be given to the times rides are allowed, the ingress/egress safety of passengers, and positive security control of the entire aircraft-ride ground operation.

c. ***Qualified aviation event participants*** have a keen interest in the conduct of a safe operation. The primary safety check-and-balance used by the aviation event organizer is the establishment of the credentials of each participant and his or her aircraft, confirmation of the participants' experience in an aviation event environment, and provision to each flying participant with the proper information regarding operations at that specific event.

28.-30. RESERVED.

CHAPTER 3. MILITARY DEMONSTRATION TEAMS

31. SCOPE AND CONTENTS. The guidelines in this chapter apply to military aircraft, military pilots, and parachute teams specifically designated to perform missions for the Department of Defense (DOD).

32. APPROVED PROFILES. All performances shall be in accordance with a planned profile approved by the applicable command. The various military teams shall provide the FAA with approved maneuver packages. Send to:

FAA
General Aviation Staff, AFS-20
800 Independence Ave., SW
Washington, D.C. 20591

33. DOD SANCTIONED TEAMS. The aerial demonstration teams sanctioned by the DOD are the U.S. Air Force "Thunderbirds" and the U.S. Navy "Blue Angels."

34. OTHER MILITARY TEAMS NOT SANCTIONED BY DOD. Other military teams who frequently perform at public events are the Army and Navy Service Academy Teams. Operations by the academy teams are maintained by their respective academy staff. The requirements for a performance by a DOD nonsanctioned team shall be the same as those for a civilian team.

35. MILITARY PARACHUTE TEAMS. One DOD-sanctioned military parachute team is the U.S. Army Golden Knights. The Golden Knights have two demonstration teams as well as competition teams (e.g., the Black Team and the Gold Team). Therefore, more than one unit operating under the designated team name could be jumping at two different locations. The U. S. Navy "Leap Frogs" are also a DOD-sanctioned parachute team.

a. ***The military team determines*** site acceptability, effect of wind conditions, and location of exiting the aircraft. This includes the decision to exit over a congested area and the determination of authorized passengers during performances. DOD accepts the responsibility for these technical judgments with respect to the safety of the jump exhibition.

b. An *FAA Form 7711-2* must be submitted to the FAA FSDO having jurisdiction over the area in which the jump will occur. The application must contain a statement that the military command or service has determined that adequate safety margins exist at the demonstration site for the scheduled demonstration by the specific team on a specific date.

c. ***Other military jump teams,*** such as the U.S. Navy's "Chuting Stars," are not DOD-sanctioned. They may be allowed to perform the same jumps as civilians with a USPA Class C or D license. Determination of site acceptability, wind conditions, and location of exit from the aircraft (including exit over congested areas) shall be made by the team leader. DOD accepts the responsibility for these technical judgments with respect to safety. An FAA Form 7711-2 shall be submitted to the FAA FSDO having jurisdiction over the jump area.

36. TEAM QUALIFICATIONS AND TRAINING. The proficiency and ability of the members of military units are determined by the military command. Therefore, members of military demonstration teams should not be questioned about their competency to perform their approved routines.

37. MILITARY PARTICIPATION. DOD requires that a DOD Form 2535, Request for Military Aviation Participation, be completed for all military aircraft events not conducted on a military installation. To obtain a copy of DOD Form 2535, contact the nearest local military installation. DOD Form 2535 must be completed by the event sponsor or a designated representative. The sponsor or representative must forward

DOD Form 2535 to the appropriate FAA FSDO for the completion of the feasibility determination. DOD requires that any event requiring a waiver of the FAR must have the proposed site classified as either "satisfactory" or "unsatisfactory" during a feasibility study of the site conducted by an FAA inspector. A "satisfactory" classification indicates that following compliance with requirements, a waiver can be issued. An "unsatisfactory" classification indicates that the site is not approved for the requested military operations portion of the aviation event. If the site is marked "unsatisfactory" by the FAA, the request is not accepted by DOD.

38. SPECIALIZED TEAMS. The armed forces also sanction specialized teams which demonstrate the capabilities of one particular aircraft, e.g., the U.S. Air Force F-16 Tactical Demonstration Team. These specialized teams also develop maneuver packages which define the aerobatic routine to be performed at aviation events. A list of pilots authorized to conduct the aerobatic routines may be obtained from the FAA FSDO. Only designated aircraft and pilots may perform at aviation events in which FAR § 91.71 is waived. Demonstrations by these specialized teams must have command approval. If the local national guard group wants to perform aerobatics at an aviation event, a maneuvers package, approved by its command, must be submitted for review and approval well in advance of the performance.

39. ARRIVAL DEMONSTRATIONS. Military aerial demonstration teams may wish to put on an arrival show when they fly into the site of a scheduled aviation event. This normally consists of several passes for visual familiarity with existing landmarks and the practice of maneuvers using these landmarks. If a waiver is required for the arrival demonstration, the details should be worked out during the meeting with the FAA FSDO inspector-in-charge. The FAA will approve the arrival show provided it can be safely accomplished.

a. ***If the arrival show means aerobatic operations over populated areas,*** the show shall not be authorized. A good rule of thumb for determining whether or not an arrival show will be approved is, "Will everything necessary for the event itself be taken care of except crowd control and emergency facilities?" If the answer to this question is NO, then an arrival show can only consist of normal flight operations conducted within the FAR.

b. ***The military often asks to have the team "advance man" accept the arrival show briefing*** and relay all necessary information to the team. If the advance man is a rated aviator serving with the team, this should be allowed. Briefings with the team leader, or a representative, must be completed before the team's arrival at the local show site.

40. FOREIGN MILITARY TEAMS. The considerations and procedures of this chapter also apply to military teams sanctioned by other countries.

41. DOD FEASIBILITY STUDY. Before a DOD-sanctioned aerial demonstration team or parachute team accepts an invitation to participate at an aviation event, DOD requires that the FAA conduct a feasibility study to determine whether or not the proposed operation can be conducted.

a. ***Sponsor Responsibilities.*** It is the responsibility of the event sponsor to obtain and to submit DOD Form 2535 to the FAA.

b. ***Conducting a Feasibility Study.*** The feasibility study is normally conducted during the late summer months for an aviation event that will take place the following show season. Normally, an on-site inspection is required, as a minimum, to determine the status of new construction or other environmental changes in the area.

c. ***Inspector Requirements.*** If the inspector believes that the 7.5 series Topographic Quad-

rangle Map for the area is necessary to conduct the feasibility study, the inspector will request the map from the sponsor of the event. This may be necessary at a site where the U.S. Navy "Blue Angels" or the U.S. Air Force "Thunderbirds" are appearing for the first time or at sites where new construction may affect a location's suitability for an aviation event.

42. SPECIAL WAIVER PROVISIONS. While the FAA has emphasized the need to maintain standard aviation event separation requirements at sites where it can be accomplished, the aerial demonstration teams may request and receive a special waiver of FAR §§ 91.79(b) and (c) for nonaerobatic flight at altitudes of 200 feet above the highest obstacle within a 3 nautical mile distance from the designated show center along the approved ingress/egress route to and from the aerobatic maneuvering area. The request for the special waiver by the Commanding Officer of the military team should be approved provided:

a. ***An on-site survey of the demonstration area*** has been completed by the Commanding Officer of the military demonstration team or a designated member of the team.

b. ***A meeting with the Commanding Officer*** or a designated member of the team, the waiver applicant or designated representative, and the appropriate representative of the FAA FSDO has been held to discuss the potential impact of the operation on the surrounding area.

c. ***A letter requesting a special waiver*** of FAR §§ 91.79(b) and (c), minimum safe altitudes, from the Commanding Officer or the designated member of the team is provided to the FAA FSDO. The letter should specify the altitudes and area over which the special waiver is required. The letter should also state that the Commanding Officer or the designated member of the team, as an authorized representative of the DOD, has completed an on-site survey of the proposed area of operation, has discussed the impact of the operation with the event waiver applicant and the appropriate FAA FSDO representative, and that the demonstration, as provided to the FAA in the command maneuvers package, can be safely conducted in the area. It should further state that the Commanding Officer will accept full responsibility for the operation.

d. ***DOD has agreed*** to approve official demonstration events only when safety is not derogated. Under no circumstances will flight at altitudes less than 500 feet above ground level (AGL) be conducted over designated spectator areas nor shall aviation event aerobatic maneuvers be conducted over spectator or congested areas.

e. ***While the guidelines in this chapter*** are primarily oriented to U.S. military precision flight demonstration teams, the procedures may also be applicable to foreign teams. A Letter of Authorization for lower than standard minimums for foreign military teams shall be issued by AFS-20, and only under special circumstances.

f. ***Any questions*** a sponsor may have involving a team should be directed to:

U.S. Army Parachute Team Operations Officer
Box 70126
Ft. Bragg, NC 28307-0126
(919) 396-2036

U.S. Navy Blue Angels
Events Coordinator
NAS Pensacola, FL 32508
(904) 452-2585

U.S. Air Force Thunderbirds
Air Show Coordinator
P.O. Box 9733
Nellis AFB, NV 89191
(702) 652-9593

43.-48. RESERVED.

CHAPTER 4. AIR RACE COURSE DESIGN

49. SPONSOR RESPONSIBILITIES. The sponsor has the responsibility to lay out the course in such a manner so as to prevent hazards to spectators and other persons on the surface.

50. PERSONNEL. Only persons and vehicles authorized by the race organization at the event should be permitted beyond the crowd line during racing operations.

a. ***Authorized persons*** include press, crews, and officials at the start line.

b. ***Authorized persons should clear the runway*** and move back to at least the runway "hold short" line 1 minute before launch for standing starts. No one should be permitted in front of the front row of aircraft after this time except the starter flag team.

c. ***Pylon crews*** (except the home pylon flag crews), press, and vehicles should remain inside the pylon course during races. Race timing teams are permitted in the area between the crowd line and the showline during racing.

51. TYPICAL RACE COURSES. A diagram of a typical air race site is shown in Appendix 1, Figure 18. A map of a typical unlimited race course (Reno, NV) is shown in Appendix 1, Figure 19. Four examples of suitable air race site diagrams are shown in Appendix 1, Figure - 20. The method of determining the various distances used are discussed in the following paragraphs.

52. RACE COURSE DESIGN. Closed-course pylon air racing is conducted over a fixed, short-distance race course, usually located on or adjacent to an airport. The design of a satisfactory pylon air race course involves the shape of the course itself and the relationship of that course to the spectator areas. Both of these depend upon the maximum speed that may be expected from the racing aircraft and the maxium "g" loading (acceleration forces) that the race aircraft are expected to encounter when flying the race course in a normal manner. Additionally, the maximum height at which race aircraft are expected to fly during the race becomes a factor.

53. RACE COURSE SPEEDS. The following speeds are typical speeds for each racing class.

a. ***Formula Vee:*** 160 miles per hour.

b. ***Sport Biplane:*** 210 miles per hour.

c. ***AT-6/SNJ:*** 225 miles per hour.

d. ***International Formula One:*** 250 miles per hour.

e. ***Unlimited:*** 450 miles per hour.

f. ***When additional classes become active,*** they should be added to this list with appropriate speeds specified.

g. ***The maximum "g" loading*** for a race aircraft flying the course in a normal manner has been set at 3.5 "g's." Note that in actual racing, where maneuvering and turbulence are encountered, momentary "g" loadings in excess of this figure can be expected.

h. ***The speed and "g" loadings*** permit the calculation of the minimum radius turn that should be permitted in the design of the race course. The formula for the turn radius for a given "g" loading and speed is: (Using a value of 3.5 for "g," the minimum turn radius is shown for each racing class in Appendix 1, Figure 21.)

$$R = \frac{V^2}{32.2 \times \sqrt{g^2-1}}$$

R = Minimum turn radius
V = Aircraft speed (ft/sec)

G = Max acceleration (ft/sec^2)
32.2 = Acceleration of gravity (ft/sec^2)

i. ***The angle of the turn*** (the change in course required to negotiate the turn) should be planned so that it will avoid forcing a race aircraft to make the turn too sharply. A maximum turn angle that does not exceed 65° has been found to be satisfactory.

54. RACE COURSE SHOWLINE. During the race, aircraft occupy a raceway around the race course. The edge of this raceway closest to the spectator area is generally the showline over which no aircraft is permitted to pass while racing.

a. ***The raceway width may vary*** from 150 feet to 500 feet in the various racing classes to allow aircraft to pass one another. The critical requirement is that no racing aircraft is permitted to pass over the showline during the race.

b. ***The minimum turn radius, the maximum turn angle, and the raceway width*** define the limits of a satisfactory race course. The race course relationship to the spectator areas (or other populated area) should also be defined. Racing classes with a maximum speed of 250 miles per hour or less require a spacing of 500 feet between the spectators and the showline. The unlimited racing class (or other new classes with speeds in excess of 250 miles per hour) requires a spacing of 1,000 feet between the spectator and the showline.

c. ***An additional safety area*** is required to ensure that spectators are protected in the event that debris leaves a race aircraft. Should this occur while the aircraft is in a turn, the debris will follow a path tangential to the turn at the moment it departs the aircraft. The straight line distance that the debris will fall before hitting the ground (ignoring air resistance) will depend upon aircraft speed and aircraft altitude. This distance is called the "scatter distance."

(1) *A maximum racing altitude* of 250 feet is acceptable for aircraft weighing in excess of 1,000 pounds (presently, the AT-6/SNJ and the unlimited class), and a maximum racing altitude of 150 feet is acceptable for aircraft weighing 1,000 pounds or less (presently the International Formula 1, Sport Biplane and Formula Vee Classes). The length of the scatter distance for each racing class is shown in Appendix 1, Figure 21.

$$S = V \times \sqrt{\frac{2 \times A}{32.2}}$$

S = Scatter distance
V = Aircraft speed (ft/sec)
A = Aircraft altitude (AGL)
32.2 = Acceleration of gravity (ft/sec^2)

(2) *The locus of all possible debris impact points* from an aircraft in a turn describes a circle whose radius is the square root of the sums of the squares of the turn radius and the scatter distance. This radius is called the "scatter radius" (Appendix 1, Figure 21).

$$Sr = \sqrt{(R^2 + S^2)}$$

Sr = Scatter radius (feet)
R = Turn radius (feet)
S = Scatter distance (feet)

(3) *In order to provide an acceptable margin of safety,* the differences between the turn radius and the scatter radius are multiplied by a safety factor of 1.5 and added to the turn radius to define the "safety radius" (Appendix 1, Figure 21).

$$Sfr = R + 1.5 \times (Sr - R)$$

Sfr = Safety radius (feet)
Sr = Scatter radius (feet)
R = Turn radius (feet)

(4) ***The turn that is critical*** with respect to the safety radius is the turn that enters the portion of the race closest to the spectators. The safety area is constructed as follows:

(i) Divide the angle for the turn in question in half.

(ii) Mark off the minimum turn radius for the class of aircraft racing as shown in Appendix 1, Figure 21, from the pylon position to a point on the angle bisector.

(iii) Draw an arc whose radius is the safety radius from the point located in paragraph 54b. No spectator areas should be within this arc.

(5) *In some cases, it may be expedient* to design the race course around the spectator area. While spectator-to-showline distances are unchanged, the safety zone is now outside the spectator area and is no longer a factor. Roads to this kind of a race course layout must be completely closed off to the spectator area during the race.

(6) *Race courses are normally flown* in a counter-clockwise direction (left turns). Problem sites may require flying the course in a clockwise direction (right turns). Other modifications of the race course, such as changing the angular relationships of the spectator line (to move the crowd away from a turn pylon) or lengthening the race course (to move the turn pylon away from the crowd) may also be necessary.

55.-58. RESERVED.